Appl. No. 10/710,894
Amdt. dated June 9, 2006
Reply to Office action of March 24, 2006

REMARKS

1. Amendments to the claims

As supported by specification paragraph [0017], claim 6 is amended and no new matter is introduced. Consideration of amended claim 6 is respectfully requested.

5   As supported by specification paragraph [0019], claims 12 & 13 are newly entered and no new matter is introduced. Particularly, paragraph [0019] states "In another embodiment, the two regular patterns are respective sync patterns from two non-adjacent frames". Consideration of newly added claims 12 & 13 is respectfully requested.

2. Claims 1-10 rejected under 35 U.S.C 102(b) as being anticipated by US Patent No.

10   6,147,530, issued to Nogawa.

In regards to Examiner rejections on Claims 1-10 in view of the teachings of Nogawa, applicant asserts that the two inventions differ conceptually and functionally, and as such rely on different structures and methods of execution to perform their respective functions. Applicant asserts that Nogawa utilizes a technique that only considers a single frame of an

15   incoming EFM signal to control a PLL circuit. This in contrast to the present invention, where a number of periods between two regular patterns within two different frames are considered in order to provide a wider tracking range. Further details regarding specific claim rejections are detailed below. Underlined text is used to provide additional emphasis.

20   In regards to claim 1, applicant asserts that Nogawa does not teach calculating a number of periods of the phase locked signal corresponding to a distance between the two regular patterns. The Examiner has suggested that the frequency comparator 2 detects the SYNC patterns (SY) as the two regular patterns within two different frames. Operation of the frequency comparator 2 is illustrated in Fig. 6 comprising " Pulse width counting unit

25   21 measures a period between <u>a rising edge of data signal train ID</u> which is an EFM

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signal and a <u>subsequent rising edge</u> thereof" (Col 12 line 67 – Col 13 line3, emphasis
added). Because "One frame is composed of 588 bits" and "At the head of the frame, a
synchronization pattern (SYNC) exists" (Col 12 lines 61-62), applicant points out that
Nogawa cannot properly calculate the distance between two SYNC patterns. This is

5   because the pulse width counting unit 21 of frequency comparator 2 merely calculates a
period between subsequent edges. Should the first edge correspond to a first SYNC
pattern detected, the subsequent edge cannot correspond to the subsequent SYNC pattern
because they are by definition separated by a frame having length of 588 bits, with the
SYNC signal only at the head of the frame. Therefore, applicant points out that Nogawa

10   does not teach calculating a number of periods corresponding to a distance between two
regularly repeating patterns (SYNC patterns) within two different frames as the frequency
comparator 2 compares subsequent edges and cannot perform calculations beyond a
single frame.

15   Additionally, applicant asserts that Nogawa does not teach adjusting the frequency
of the phase locked loop signal according to the number of periods between two regular
patterns (SYNC patterns). The Examiner has suggested that the frequency comparator 2
outputs FCUP and FCDN signals to control VCO 5 and perform this feature. However,
Nogawa teaches "Frequency error output unit 24 (of frequency comparator 2, Fig. 6)

20   calculates the frequency difference...based on the pulse width of bottom value P3 held
within a preset hold period H3, and outputs either frequency error signal FCUP or
FCDN" (Col 13 lines 9-13) and "Bottom value P3 output from bottom hold unit 23 is <u>a</u>
SYNC pattern SY of EFM signals" (Col 14 lines 31-32). Therefore, because P3 only
contains a <u>single</u> SYNC pattern, applicant asserts that Nogawa does not calculate the

25   number of periods between two SYNC patterns and subsequently does not teach adjusting
the frequency of the phase locked loop based on this difference. Conversely, Nogawa
teaches "the difference between bottom value P3 and pulse width 22T of the SYNC
pattern SY in a normal operation shows the frequency difference between data signal

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train ID and regenerated clock CK" (Col 14 lines 33-35). Therefore, applicant points out that Nogawa adjusts the oscillator of the PLL according to the difference between measured pulse width of a single SYNC pattern in bottom hold unit 23 with a predefined standard width for the SYNC pattern ("The SYNC pattern is defined to be 22T" (Col 12

5   line 63)). This is in contrast to the present invention, where the oscillator adjusts the frequency of the phase locked loop signal according to the number of periods between two regular patterns (SYNC patterns) within two different frames.

Regarding Claim 2, applicant asserts that Nogawa does not teach a counter for

10   calculating the number of periods of the phase locked signal corresponding to the distance between the two regular patterns, where each pattern is in an individual frame. The Examiner has suggested counter 212 and hold units 22, 23 for similarly performing this operation. Nogawa details operation of the counter 212 through the timing chart of Fig. 7, where only one SYNC pattern (signal SY from t_1 to t_2) is required for operation/illustration. Nogawa

15   teaches "Edge detecting circuit 211 detects a rising edge of SNYC pattern SY...edge detecting circuit 211 generates a corresponding edge detection signal C1" and " inverse regenerated clock CKI rises at almost the same time as the rising/falling edge of SY of SYNC pattern" (Col 14 lines 53-64). Because "Counter 212 uses edge detection signal C1 and inverse regenerated clock CKI as a reset pulse and a clock respectively, and counts up at

20   every period (T) of inverse regenerated clock CKI." (Col 14 lines 64-67), applicant asserts that counter 212 simply counts the number of periods corresponding to the width of a single SYNC pattern. This is verified through visual inspection of Fig. 7 where the SYNC pattern SY coincides with "the value of the count corresponding to pulse width P1 is 20" (Col 15 line 6). Nogawas' use of the counter contrasts the present invention, where the number of periods

25   corresponding to the distance between the two regular patterns is counted.

Regarding the comparator of claim 2, the Examiner has suggested that the frequency error output unit 24 of Nogawa performs similar functions of comparing the number of

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periods between the two regular patterns with a predetermined value to generate a control
signal, and using the control signal to adjust the frequency of the phase locked signal.
Applicant asserts that because Nogawa does not teach calculating the number of periods
between two regular patterns (SYNC patterns), it cannot compare this value with the
5   predetermined value to adjust the PLL frequency. Applicant points out that Nogawa
utilizes the frequency error output unit 24 to adjust the oscillator of the PLL according to
the measured pulse width of a single SYNC pattern in bottom hold unit 23 (see remarks
make regarding the frequency error output unit 24 in claim 1 for further details). The
Examiner has also suggested that the predetermined value as the SYNC pattern SY of
10   Nogawa. However, applicant asserts through inference that there would be no reason to
compare the number of periods between the two regular patterns (SY) with the SYNC
pattern SY with as they are unassociated quantities. Therefore, applicant asserts that
frequency error output unit 24 of Nogawa must compare a measured width of single
SYNC in P3 with a predetermined value (see Col 12 line 63 and comparison examples in
15   Col 15 lines 1-29).

Regarding claims 3-4, applicant respectfully requests reconsideration in view of the
response provided above for intervening claim 2. As Claims 3-4 are dependant on claim 2,
applicant asserts that if allowance is made for Claim 2, then similarly, allowances should be
20   made for dependant claims 3-4 also.

Regarding claim 5, applicant respectfully requests reconsideration in view of the
response provided above for independent claim 1. As Claim 5 is dependant on claim 1,
applicant asserts that if allowance is made for Claim 1, then similarly, allowances should be
25   made for dependant claim 5 also.

Regarding currently amended claim 6, applicant asserts that Nogawa fails to teach or
suggest using a numerical controlled oscillator or a current controlled oscillator in PLL to

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generate an oscillation signal. Additionally, as currently amended claim 6 is dependant on claim 1, applicant asserts that if allowance is made for Claim 1, then similarly, allowances should be made for dependant claim 6 also.

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Regarding claim 7, applicant points out that this is a method claim corresponding to the PLL device described in claim 1. In particular, applicant asserts that step (c) "calculating a number of periods of the phase locked signal corresponding to a distance between the two regular patterns" of claim 7 is not taught by Nogawa. Further details can be provided in

10   the remarks made for claim 1, as they are equally applicable to claim 7. Applicant respectfully requests re-evaluation of Claim 7 in reconsideration for its allowance.

Regarding claims 8-10, applicant respectfully requests reconsideration in view of the response provided above for Claim 7. As Claims 8-10 are dependant on Claim 7, applicant

15   asserts that if allowance is made for Claim 7, then similarly, allowances should be made for dependant claims 8-10 as well.

Regarding claim 11, as stated by the examiner in the Allowable Subject Matter, the prior art of record fails to suggest or disclose the claimed feature. As claim 11 is dependant on claim 1, applicant asserts that if allowance is made for Claim 1, then similarly, allowances

20   should be made for dependant claim 11 as well.

3. Patentability of new claims

Claims 12 and 13 are newly entered. As disclosed in specification paragraph [0019], the present application teaches measuring the distance between two regular patterns in two

25   non-adjacent frames to achieve higher resolution. However, in view of the response provided above for independent claim 1, applicant asserts that Nogawa does not teach calculating a
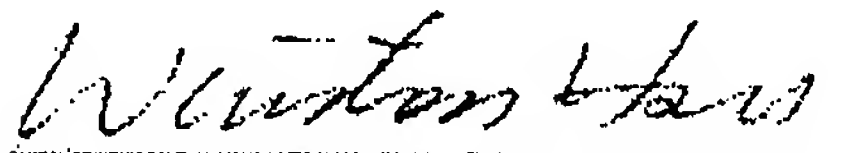
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number of periods of the phase locked signal corresponding to a distance between two regular patterns within two non-adjacent frames. As claims 12 and 13 are dependant on claim 1 and claim 7 respectively, applicant asserts that if allowance is made for Claims 1 & 7, then similarly, allowances should be made for corresponding dependant claims 12 and 13 as well.

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Applicant respectfully requests that a timely Notice of Allowance be issued in this case.

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Sincerely yours,

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20   Note: Please leave a message in my voice mail if you need to talk to me. (The time in D.C. is 12 hours behind the Taiwan time, i.e. 9 AM in D.C. = 9 PM in Taiwan.)

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